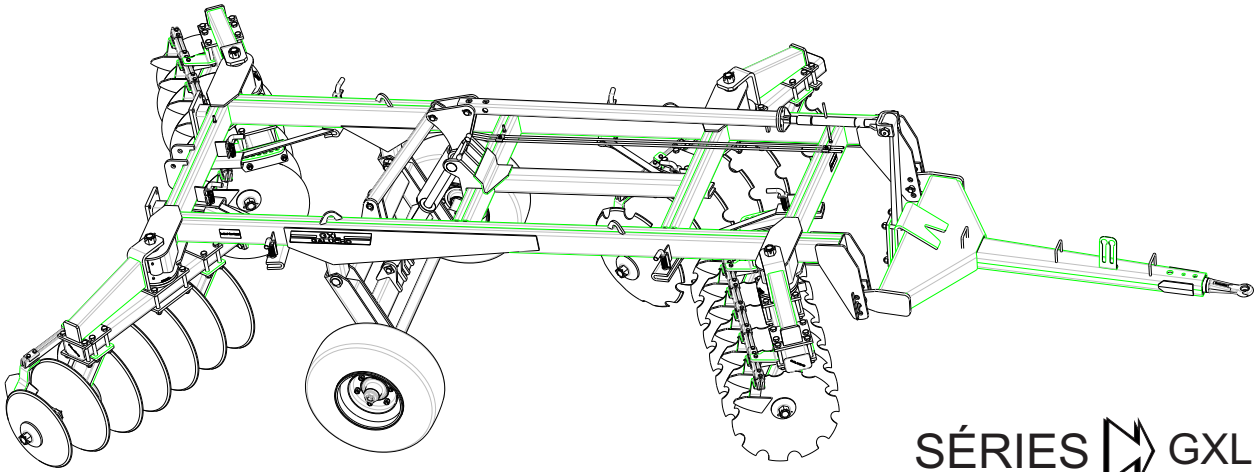
GALUCHO

OPERATOR'S HANDBOOK AND SPARE'S LIST

Trailed Tadem Disc Harrows



SÉRIES GXL

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RECOMMENDATIONS TO THE OWNER

The decision to opt for **GALUCHO** was a good one. The result of many years of experience, under the most difficult and diverse working circumstances, **GALUCHO** material gives complete satisfaction to its many thousands of users, both in Portugal and in over 40 countries, of different continents, where it is already at work.

We are sure that, if used properly, and given the necessary care to maintenance, the machine you have just acquired will perform the efficient and economical job for which it was designed, and which a user has the right to expect from it. The present manual contains very important instructions concerning set-up, tuning, maintenance, etc., As well as diagrams and a parts list.

Begin by **reading it, attentively**, in order to familiarise yourself with the material.

Then, keep it in secure and acessible place, for future consultation.

If you still have doubts, consult the distributor who supplied the machine, or else consult us, as it is in all of our interests that you be satisfied with, and obtain maximum yield from your purchase.

X

Recordings and technical data are indicated by name and subject to alterations without previous notification.

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CONDITIONS OF GUARANTEE

1 - Our company guarantees all the agricultural equipment which is manufactured for a period of two years from the date of invoice.

1.1 - This guarantee only includes the supply of replacement parts or components which are proved to be deficiently made or installed, and does not cover the payment of manual labour or displacement costs.

1.2 - Any components considered by this company to the worn out, are excluded from the guarantee.

1.3 - The guarantee given by this company will not include any parts not made by themselves, for examples tyres, which will remain the exclusive responsability of their respective manufacturer, and this decision will be communicated to the claimant with all its consequences.

2 - Reasons for immediate loss of guarantee:

2.1 - Use of equipment in abnormal working conditions, or used with tractors of different powers than those indicated, in each different case, in our technical literature.

2.2 - The substitution of pieces or accessories for others not made or recognised by this company.

2.3 - Any repair or alteration done, during the period of guarantee, without our knowledge or authorisation.

3 - All claims against the guarantee must be communicated to us by the respective retail agents, by means of a claim form. The pieces or accessories, which are the objects of complaint, must be sent for examination to our Technical Services and Quality Department.

If the reasons for the complaint are confirmed and accepted, new pieces will be supplied, or their value credited to the customer, if already sent.

4 - The powers indicated in our catalogues and other literature as necessary for certain equipment of our construction, may vary according to the different types and states of the earth, the experience of the operator, the state of the tractor, and the adherence of the latter to the terrain on which it is working.

5 - This company can only accept the return of equipment to the factory, within a maximum of 15 days after the sending of the invoice, providing it has not been used in a working situation, it is not a model already withdrawn from production, or if it is still part of our production range, there have been no alterations made to the model.

6 - In compliance with regulations determined in the Directiva Máquinas/CE (Machines Directive/CE), this company:

6.1 - Manufactures its machines respecting the relevant safety regulations, namely with respect to the protection of moving parts;

6.2 - Supplies a certificate of conformity, refering to the norms and regulations fullfilled;

6.3 - Supplies a user's manual and catalogue of parts for each machine.

NOTE: Every Galucho dealer is obliged to supply the eventual consumer with:

- The safety devices, fixed or detachable, relevant to each machine;
- The certificate of conformity and the user's manual with a catalogue of parts for each machine.

7 - We recommend the reading of our pamphlet: "General Conditions of Sale and Payment".

8 - For any necessary clarifications, please consult our Comercial Services.

INNOVATIONS

GALUCHO-IND. METALOMECÂNICAS, Plc. continually attempts to perfect its products, reserving itself the right, at any time, to make alterations to the design and/or to the specifications of construction materials, and its respective components, without incurring, as a result, the obligation to apply these alterations to machines previously made and sold.

1-EXPLANATORY NOTE

Although all the models of GXL series are dimensionaly different - 26 to 38 discs- the assembly, adjustment, maintenance, etc. details are the same.

The existing structural differences may be verified in the characteristics table or in the drawings of the corresponding components.

2-CONSTRUCTION

Chassis -(Fig. 1 -A) - Rigid set, composed by longitudinal and transverse double C profiles, meant to support the disc gangs, the lifting and transportation gear, as well as other components - same of them supplied as optional.
On the front part are located the supports where the transverse bar will be connected (Fig. 2-F), on which is fixed the entire set of the tractor-hook shaft(Fig. 2-B)

Disc Gangs - Front (Fig. 1-B) and rear (Fig. 1-C), each one of them composed by an axle on which the discs, disc spacers and bearings are assembled, all of them supported by a spar, on which the scrapers are assembled.
As shown in Fig. 6, all the disc gangs are drawn back on their supporting spar, which allows for a wider free distance to the ground

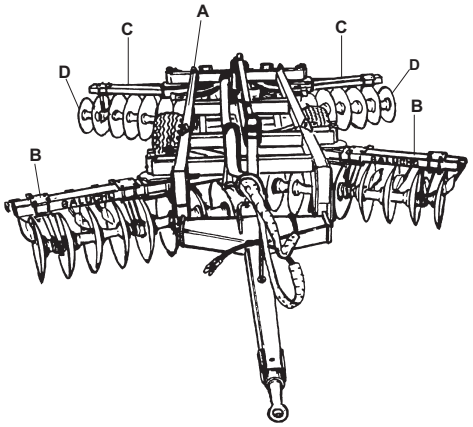


Fig. 1

A- Chassis
B- Front Gangs
C- Rear Gangs
D- Finishing Discs

As shown in Fig. 6-B all the bearings may be moved laterally, which allows the variation of the disc gangs.

The front right gang and the rear left gang have the concavity of the discs turned to the right side . Apposite, on the front left gang and rear right gang the same concavity is turned to the left side. In all the cases, the adjustable scrapers are assembled behind the discs (Fig. 6).

Lifting and transportation Wheels (Fig. 3) - it is composed by an articulated set, started by a double effect cylinder (Fig. 3-C) and on which are assembled 2 tyre wheels. This set includes a mechanical working depth adjustment (Fig. 3- D)

3 - ASSEMBLY

When disassembled, the GXL disc harrow series is composed by:

- Chassis with hydraulic system and mechanical working depth adjustment.
- 4 disc gangs
- Transverse offset bar with spring plates and fixed drawbar.
- 2 tyre wheels.
- Set of hoses.

Its assembly must be carried out according to the following procedures:

1- Assemble the transverse offset bar and fixed drawbar

2- Attach, the leveling adjuster to the spring plate ring on the articulation rods (Fig. 5 - B). The hydraulic option is shown in (Fig. 5 - A).

3-Connect the 2 hoses from the hydraulic cylinder for work and transport.

4-Attach the drawbar to the tractor.

5-Start the hydraulic cylinder to look for the best assembly position for one of the outer tyre wheels, following the procedures given in 6.4. If necessary, help with a manual jack, lifter, etc. Afterwards and by the same process, assemble the outer wheel of the opposite side.

6-With the outer wheels tightened, lift the chassis until the position allow the assembly of the disc gangs.

7-With the help of a lifter or another identical means, move each bodies so that, in the suitable end (Fig. 4 - A)to be possible to fix the positioning bolt (Fig. 5 - A) on the outer hole. Afterwards, tighten the corresponding body gudgeon through 2 plates and 4 screws.

8- Assemble the 4 disc gang and verify if everything is connected correctly. If positive retighten all screws in the body gudgeon.

9- Connect all the other hoses, from the options, to the tractor.

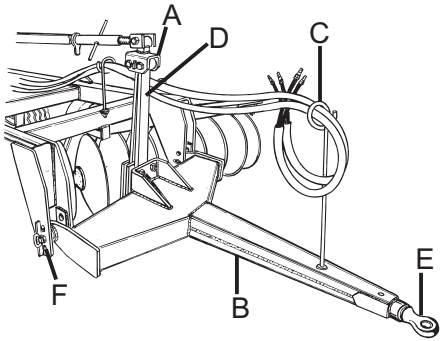


Fig. 2

A-Leaf Spring Ring
B-Drawbar
C-Hoses Supports
D-Leaf Spring
E-Drawbar Rotating Clevis
F-Drawbar regulation holes

4-ATTACHEMENT TO THE TRACTOR

After assembling the disc harrow check if everything is as it should be. For that purpose, connect all the hoses 2 by 2, to their corresponding circuits.

With the disc gangs lifted, the cylinder which commands its leveling is also tested. Should any of the circuits fail to function properly, check the tightness connections of the hoses, since these may be switched, either on the cylinders or on the tractor.

6- ADJUSTMENTS

6.1 - Height of the attachment

The transverse offset bar may be connected at 3 different heights (Fig. 2), as demanded by the type of ground and the conditions of work performance.

Thus, for normal work and average conditions, connect it to the central holes; under hard conditions and for a deeper penetration, use the upper hole; on soft grounds and for a lighter penetration, connect it to the lower hole.

It should be referred that for this adjustment it is very important the height at which the rotating clevis (Fig. 2 - E) is connected to the tractor, which may vary according to its make and model.

6.2 - Gangs opening - Manually

It establishes the variation of the attack angle and its limits are 6° and 25° on the front gangs and 12° and 30° on the rear gangs.

a) Procedure

-Lift the disc harrow gangs

-According to the intended angle, choose one of the holes (Fig. 4-A), fixing it with the corresponding position bolt (Fig. 4 - B);

-Perform the same procedures on the 4 disc gangs.

6.3 - Lateral movement of the gangs -

The best ground leveling is achieved when the soil coming out of the rear discs covers the trenches made by the front discs both laterally and on the center of the harrow. In order to cover up the trenches made by the outer discs of the front gangs these harrows have 2 finishing discs (Fig. 1 - D) assembled on the ends of the rear gangs.

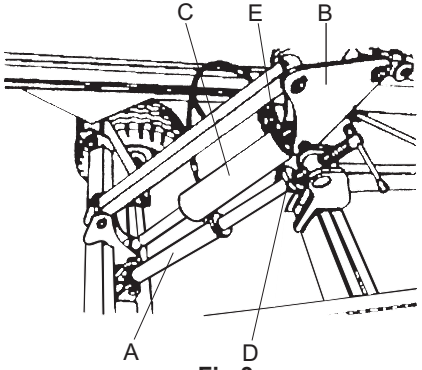


Fig 3

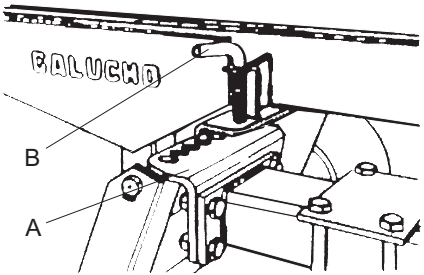


Fig. 4

Different type of grounds, or even the work speed, may cause the need to change the original assembly. For that it is necessary to move the gangs, which may be achieved by lifting them and unscrewing the 4 screws which fix the column of each of its bearings (Fig. 6 - B) to the corresponding spar, in order to allow the entire body to be moved on to the aimed side. Afterwards, retighten the same screws.

6.4 - Working Depth -

It is directly influenced by the opening of the gangs. A wider opening corresponds a deeper penetration of the discs and therefore a greater need of available power and vice-versa.
After adjusting the opening, the position of the wheels adjust the work depth, through the device which acts through the adjustable position of the backstop.

6.5 - Longitudinal leveling of the gangs -

Acting on the adjuster (Fig. 5 - B) or, if so wanted and at an extra price, on the hydraulic cylinder (Fig. 5 - A) which may replace it, it is possible to change the leveling and corresponding penetration of the harrow gangs. Increasing the adjuster length, which has a clock-wise and counterclockwise screw, the rear gangs will penetrate deeper; decreasing the length, penetration will be deeper on the front gangs and lighter on the rear ones. If for the same effect the hydraulic cylinder exists, the same procedure is obtained by lowering the corresponding control lever.

6.6 - Changing the space between disc gangs-

It's possible to change the disc gangs spacing given the mobility on the bearings fixation. Such an operation should be requested to the manufacturer, since it causes the replacement of various components.

6.7- Scrapers

They must work as closed to the surface of the discs as possible without touching them (5 to 10 mm gap).

If their wear is regular, it is possible to adjust them all at the same time in each gang, by merely untightening the screws which fix their support straight edges (Fig. 6 - G) and moving them laterally, closing the scrapers to the discs. Each scraper may also be adjusted separately, through the screws which fix it to the correspondent straight edge (Fig. 6 - F).

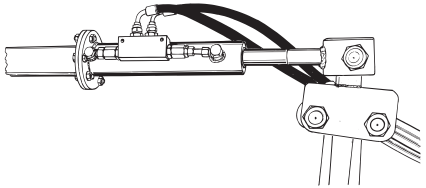


Fig 5 - A

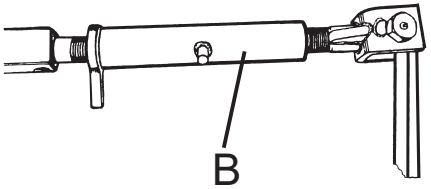


Fig 5 - B

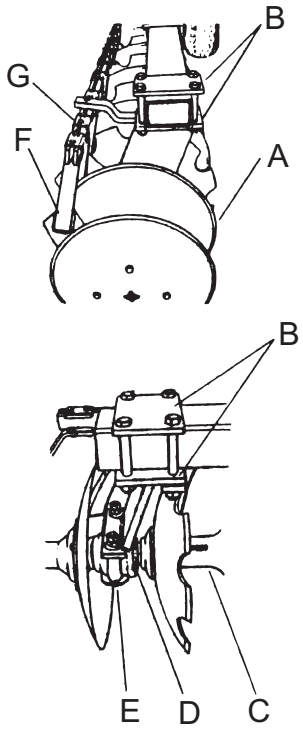


Fig. 6

5-SPECIFICATIONS

MODELS	DISCS		NUMBER OF BEARINGS	DISC SPACING (mm)	UNDER-BEAM CLEARANCE (m)	WIDTH (m)		TYRES	WEIGHT (kg)		REQUIRED POWER	
	Qt.	Diam xThick. (")(Mm)(mm)				WORK	TRANSP.		PER DISC	TOTAL	KW	CV
GXL 26 - 26	26	26-660x6	8 (4+4)	230	0.71	3.05	2.50	2X10.0/75-15.3-12T	113	2940	70-85	95-115
GXL 30 - 26	30	26-660x6	8 (4+4)	230	0.71	3.50	2.50	2X10.0/75-15.3-12T	101	3040	80-95	110-130
GXL 34 - 26	34	26-660x6	10 (6+4)	230	0.71	3.95	2.50	2X13.0/55-16-12T	91	3110	95-110	130-150
GXL 38 - 26	38	26-660x6	12 (6+6)	230	0.71	4.40	2.50	2X13.0/55-16-12T	89	3400	105-120	140-160

7 - WORKING

Of the factors that affect work performed using the equipment, we would draw attention to the type of discs fitted (diameter, weight, shape and dynamic behavior necessarily differ for different types of work) and to the type of soil and seasons of the year.

7.1- AVERAGE WORKING PERFORMANCE

Although work performance may vary due to a number of factors, it is useful to state the process for determining it.

It is necessary to know:

Ws - Average speed of working, in km/h

Ww - Working width (m)

Fe - Field efficiency. This is a corrective factor which varies for each type of work, and which is a consequence of different determining factors, such as: type and state of the soil being worked; configuration and size of the land; efficiency and effort of the operator, etc. Without too much risk of error, we can assume an average factor of Ec=0,8.

Example:

What is the average working performance of a harrow with a working width of 4.40m, working at an average speed of 10 km/h?

$$Rm = \frac{Ws \times Ww \times Fe}{10} \quad Rm = \frac{10 \times 4.40 \times 0,8}{10} = 3.52 ha/h$$

8 - MAINTENANCE

To maintain any implement in perfect working condition, and to guarantee that it has a long and profitable working life, avoiding the loss or premature wearing of its components, it is essential that some care and maintenance be invested in it, over the following periods:

8.1 - Daily

Carefully check the entire axle, especially:
-The tightness of screws, nuts, discs, axles and hoses ;
-The wear of the disc bearings, bearing wearing plates and scrapers.
-The preservation condition of the bearings, tyres, hoses and hydraulic cylinders.
-The pressure of the tyres.

8.2 - During Work

-When operating a new machine, retighten all nuts at the end of the first day's work.
- Lubricate the harrow according the following schedule:

- Every 8 hours of work

-With Grease 2, or equivalent - all the grease nipples of the various articulations
-With oil, the remaining mobile points;

- Every 100 hours of work

-With Grease 2, or equivalent - the grease nipple on each bearing;

- Every 500 hours of work

-With Grease 2, or equivalent - fill up the grease nipples of the wheels hub.

8.3 - In case of prolonged stop

-Carefully wash the disc harrow with pressurized water and shelter it from sun and rain, suspending the wheels
-Carry out an overhaul, retighten and replacing whatever is necessary.
-Start the hydraulic cylinders so that the pistons are brought in;
-Perform any necessary painting retouches, do a general lubrication and protect the discs with an anti - rust solution.

Following the previous procedures will assure the harrows, perfect work conditions for the next campaign.

Remarks:

-Always clean the grease nipples, before and after lubrication;
-Pump as many times as necessary until clean greases comes out, even from the bearings.

9 - REPLACING THE PARTS OF GREATEST WEAR

The parts of greats wear are the discs, the bearing wearing plates, the scrapers and eventually the bearings.
Their useful life depends, on the use, conditions and care with maintenance .

Discs

If the replacement concerns one single disc and this disc is located at the end of the roll, it is enough to untighten the nut on that end, remove the disc to be replaced, insert a new disc and retighten the nut.
If the replacement concerns one of the inner discs, first it is necessary to slightly untighten the nuts afterwards removing the bearing fixation screws, which produces the disconnection of the discs from the gang.
Fully unscrew the nuts of the axle remove the bearings, the spacers and the discs until reaching those which are intend to replace. Place the new discs and assemble everything by the reverse order of disassembly, strongly tightening all the nuts, not forget to place a restraint in the nuts which tighten the disc axle.

Bearing Wearing Plates

Before reaching their wear limit, they must be replaced by others, of identical characteristics.
The bolts which fix the bearing plates are the same which connect the bearings to the body. In order to replace the bearing wearing plates it is obviously necessary to unscrew the refered bolts, taking care of only disconnecting one bearing at the time, in order to avoid the separation of the roll from the body and any likely incidents.

Important remark:
If the bearing wearing plates aren't replaced before reaching their wear limit, the bearings will end up being worn out, and their replacement is much more expensive.

Scrapers

When they can't be efficiently adjusted, they must be replaced by new ones.

ORDERING SPARE PARTS

We advise you, as farmers, that replacing worn out parts at the right moment will avoid abnormal mobilisations of the machine (with the consequent loss of money and time), and will cheapen the units of work produced, and prolong its useful, economical life-span.

It is always better to use **genuine GALUCHO parts**, because:

- they are perfectly interchangeable;
- they guarantee correct adaptation and functioning.

While they could, in some cases, be a little more expensive in terms of initial cost, they always end up more economical than any other.

To simplify and speed up the supply of spare parts, it is recommended, **in the consumer's own interests**, that this procedure is followed:

(1) Indicate the model, series, and number written on the identification plate which each machine has.

(2) Outline the **quantities, codes, and designation** of the parts, as indicated by the catalogue of parts.

(3) To avoid errors, written confirmation of orders eventually transmitted by telephone is indispensable.

(4) To facilitate the completion of orders, all demands must be made separate from other correspondence, and indicate the destination and the transport to be used. In case the client has no current account with our company, he should enclose with his order, the amount which corresponds to the cost of his demand.

If the demand omits a preference, in terms of means of transport, we will use that which we feel to be most advantageous.

(5) The parts can be picked up from our warehouses, in S. João das Lampas, or placed by us in the railway or any other station, in Sintra or Lisbon.

(6) The return of parts or equipment whose parts have stopped being made, or which are still part of our production line but have been altered, will not be accepted.

The identification plates **GALUCHO** indicate the following specifications, which will be useful when ordering spare parts.

1-MODEL 2-SERIES 3-NUMBER

SECURITY REGULATIONS

Working with tractors and agricultural machines requires that the operator knows what he is doing and that much care is taken.

He must be conscious and cautious of the dangers which imprudence can cause, not just to the agricultural enterprises which they run. In an attempt to avoid accidents, therefore, we advise the following security rules:

1 - In attaching any implement to the tractor, use only the place which the respective manufacturer advised for the operation, verifying is carried out in order.

2 - Whenever, for reasons of repair, checks, set-up or otherwise, you need to get under the implement, never do so without the relevant props.

3 - In activating the hydraulic system of the tractor, first check that the implement, trailer, frontal load, or otherwise, in movement, can not reach anyone.

4 - Never authorise the transport of passangers on the implement, whether during work time or on the road, equally not behind ploughs, or grass cutters, as during their work, as stones, sticks etc. could fly up out of the machines.

5 - The implement should never be detached while in movement. If it has to be done, immobilise it well and stop the motor.

6 - Always use protective guards on transmissions linked to the power sockets of the tractor.

7 - Use counterweights on the front or on the front whells, as, with implements mounted, the steering of the tractor will be very light and it will have a tendency to uplift. Double check the maitenance during a job, manoeuvres or on the road. It could also be necessary to mount a rear weight to the tractor when operating with a frontal load, and the load being carried is particulary heavy.

8 - Do not forget that the dangers increase with the incline of the terrain on which it is working or being moved. Exercise maximum caution, paying attention to accentuated inclinations, especially lateral ones, which should be avoided.

9 - When you work with trailers, you should never forget to:

- check your brakes;
- attach the emergency brake device to the tractor;
- plug in the electric installations;

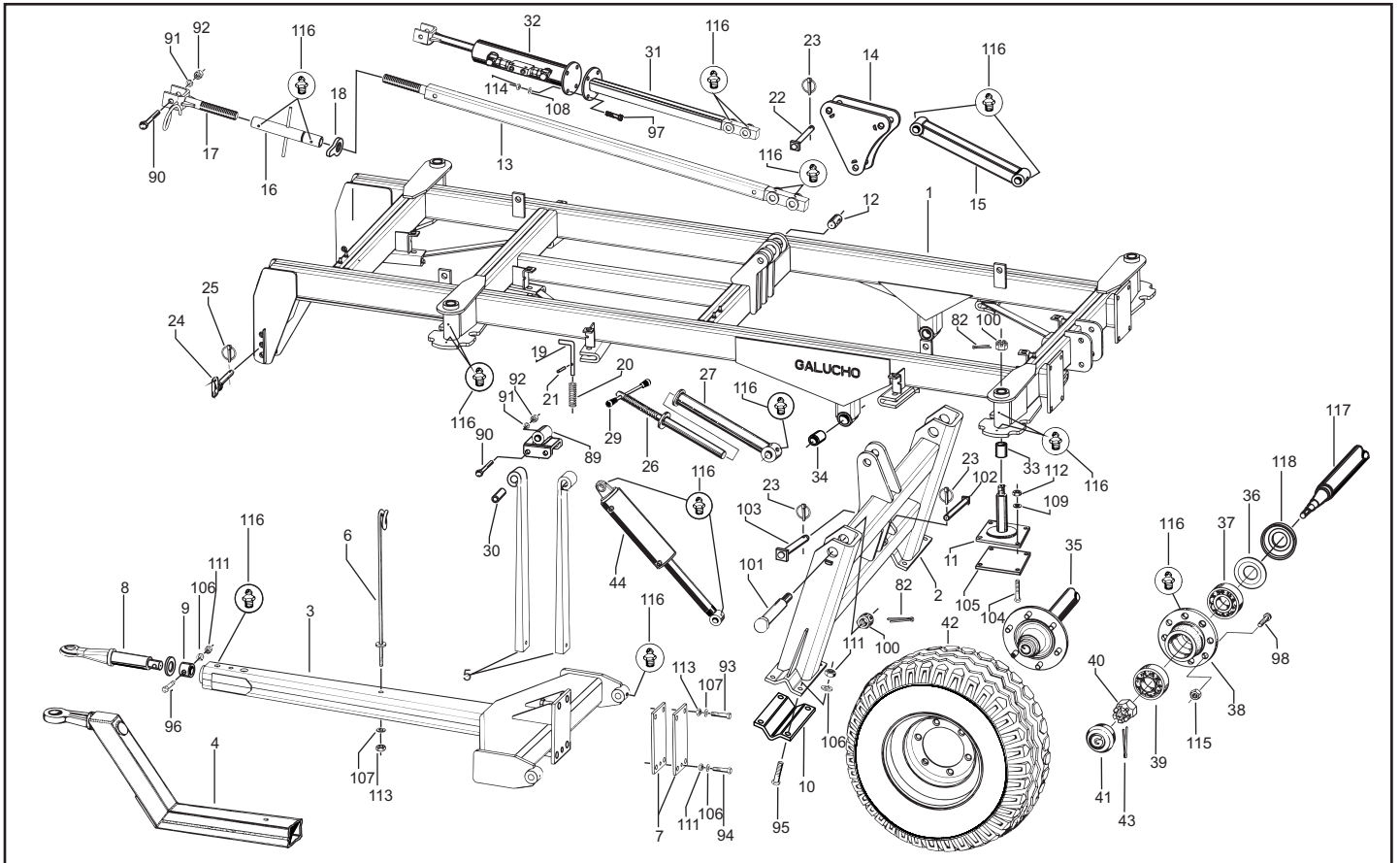
Also remember that:

- the trailer must always brake before the tractor;
- all load, especially high load , must be well fastened down;
- the two pins to fix down the box must be in the right places, depending on the side which you need to balance;
- the balancing must be light, and without jolts;
- you may only transport persons when legally authorised to do so, when they are seated, and with all the coverings closed.

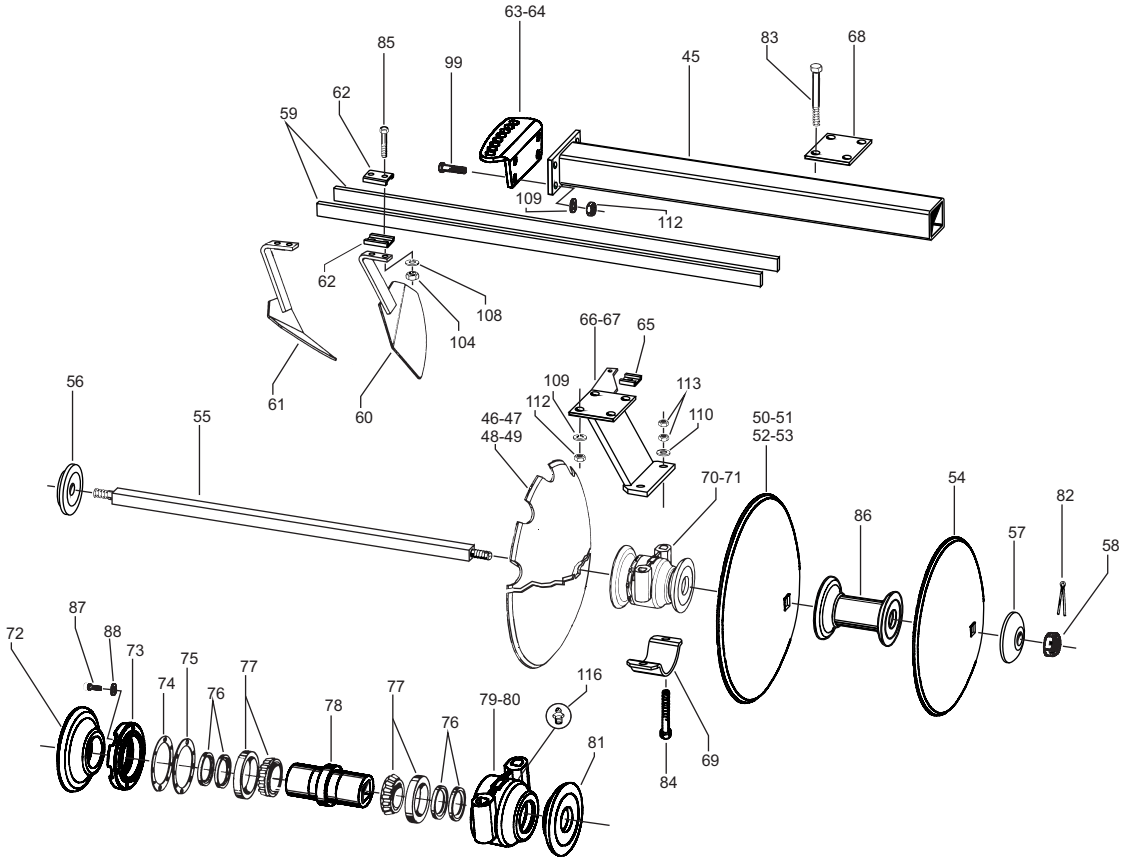
10 - Whenever in transit on a public higway remember that:

- on leaving an agricultural property, or a private road, you never have priority of entry into a public road. All other road users, coming from the left or right, have priority over you;
- you must respect the higway code and all signs and light signals;
- the stabiliser switch for the two brake pedals must be on;
- the stabilisers or the chains must be tight so that there can be on lateral oscillation of the mounted implements, which must only be lifted to the height necessary to avoid contact with the ground (aboout 0,30cm) or, if the tractor has a hydraulic blockage, until this switches on;
- speed of travel must be reduced whenever the state or the relief of the road requires it;

If you take this advice which we give here, we hope that you will neither have, nor cause any accidents. This is what **GALUCHO** wishes for, and expects from their clients.



Desen.	Verif.	Alter.	Designa. GRADE ARTICULADA EM X	Serie GXL	GALUCHO
Data 27 / 10 /98	Data 27 / 10 /98	Data ___/___/___		Cod. 22595CP01	INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL



Desen.	Verif.	Alter.	Designa.	Serie GXL	GALUCHO
Data 27/10/98	Data 27/10/98	Data ___/___/___	GRADE ARTICULADA EM X	Cod. 22595CP02	INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL

Pratical Adjustements

	OPEN THE 4 GANGS	CLOSE THE 4 GANGS	REDUCE SPEED	ADJUST THE SCRAPERS	LOWER TRANSVERSE BAR	RAISE THE TRANSVERSE BAR	LENGHTEN THE LEVELLING ADJUSTER	SHORTEN THE LEVELLING ADJUSTER	CHECK THE AUTOMATIC DEPTH CONTROL DECERASING IT	CHECK THE AUTOMATIC DEPTH CONTROL INCERASING IT
INSUFFICIENT DEPTH	■		■			■		■		■
EXCESSIVE DEPTH OF FRONT GANG					■		■			
EXCESSIVE DEPTH OF REAR GANG						■		■		
TRACTOR SKATING		■	■						■	
BLOCKING		■		■					■	

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